

SEQUENCE LISTING

<110> Kirin Beer Kabushiki Kaisha; Japan International Research Center for Agricultural Sciences

<120> A production of plants having improved rooting efficiency and vase life by using environmental stress-resistant gene

<130> P02-0988

<140>

<141>

<160> 30

<210> 1

<211> 933

<212> DNA

<213> *Arabidopsis thaliana*

<220>

<221> CDS

<222> (119)..(766)

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atg aac tca ttt tct gct ttt tct gaa atg ttt ggc tcc gat tac gag 166

Met Asn Ser Phe Ser Ala Phe Ser Glu Met Phe Gly Ser Asp Tyr Glu

1

5

10

15

tct tcg gtt tcc tca ggc ggt gat tat att ccg acg ctt gcg agc agc 214

Ser	Ser	Val	Ser	Ser	Gly	Gly	Asp	Tyr	Ile	Pro	Thr	Leu	Ala	Ser	Ser
20							25							30	
tgc	ccc	aag	aaa	ccg	gct	ggt	cgt	aag	aag	ttt	cgt	gag	act	cgt	cac
Cys	Pro	Lys	Lys	Pro	Ala	Gly	Arg	Lys	Lys	Phe	Arg	Glu	Thr	Arg	His
35							40							45	
cca	ata	tac	aga	gga	gtt	cgt	cgg	aga	aac	tcc	ggt	aag	tgg	gtt	tgt
Pro	Ile	Tyr	Arg	Gly	Val	Arg	Arg	Arg	Asn	Ser	Gly	Lys	Trp	Val	Cys
50							55							60	
gag	gtt	aga	gaa	cca	aac	aag	aaa	aca	agg	att	tgg	ctc	gga	aca	ttt
Glu	Val	Arg	Glu	Pro	Asn	Lys	Lys	Thr	Arg	Ile	Trp	Leu	Gly	Thr	Phe
65							70							75	
caa	acc	gct	gag	atg	gca	gct	cga	gct	cac	gac	gtt	gcc	gct	tta	gcc
Gln	Thr	Ala	Glu	Met	Ala	Ala	Arg	Ala	His	Asp	Val	Ala	Ala	Leu	Ala
85							90							95	
ctt	cgt	ggc	cga	tca	gcc	tgt	ctc	aat	ttc	gct	gac	tcg	gct	tgg	aga
Leu	Arg	Gly	Arg	Ser	Ala	Cys	Leu	Asn	Phe	Ala	Asp	Ser	Ala	Trp	Arg
100							105							110	
ctc	cga	atc	ccg	gaa	tca	act	tgc	gct	aag	gac	atc	caa	aag	gct	gct
Leu	Arg	Ile	Pro	Glu	Ser	Thr	Cys	Ala	Lys	Asp	Ile	Gln	Lys	Ala	Ala
115							120							125	
gct	gaa	gct	gct	ttg	gct	ttt	cag	gat	gag	atg	tgt	gat	gct	acg	acg
Ala	Glu	Ala	Ala	Leu	Ala	Phe	Gln	Asp	Glu	Met	Cys	Asp	Ala	Thr	Thr
130							135							140	
gat	cat	ggc	ttc	gac	atg	gag	gag	acg	ttg	gtg	gag	gct	att	tac	acg
Asp	His	Gly	Phe	Asp	Met	Glu	Glu	Thr	Leu	Val	Glu	Ala	Ile	Tyr	Thr
145							150							155	
gct	gaa	cag	agc	gaa	aat	gct	ttt	tat	atg	cac	gat	gag	gct	atg	ttt
Ala	Glu	Gln	Ser	Glu	Asn	Ala	Phe	Tyr	Met	His	Asp	Glu	Ala	Met	Phe
165							170							175	
gag	atg	ccg	agt	ttg	ttg	gct	aat	atg	gca	gaa	ggg	atg	ctt	ttg	ccg

Glu	Met	Pro	Ser	Leu	Leu	Ala	Asn	Met	Ala	Glu	Gly	Met	Leu	Leu	Pro
180								185					190		
ctt	ccg	tcc	gta	cag	tgg	aat	cat	aat	cat	gaa	gtc	gac	ggc	gat	gat
Leu	Pro	Ser	Val	Gln	Trp	Asn	His	Asn	His	Glu	Val	Asp	Gly	Asp	Asp
195								200				205			
gac	gac	gta	tcg	tta	tgg	agt	tat	taaaaactcag	attattattt	ccatTTTtag				796	
Asp	Asp	Val	Ser	Leu	Trp	Ser	Tyr								
210								215							
tacgatactt	tttattttat	tatttttt	agatcctttt	ttagaatgga	atcttcatta									856	
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<211> 216

<212> PRT

<213> *Arabidopsis thaliana*

<400> 2

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20								25					30		

Cys	Pro	Lys	Lys	Pro	Ala	Gly	Arg	Lys	Lys	Phe	Arg	Glu	Thr	Arg	His
35								40				45			

Pro	Ile	Tyr	Arg	Gly	Val	Arg	Arg	Arg	Asn	Ser	Gly	Lys	Trp	Val	Cys
50									55			60			

Glu	Val	Arg	Glu	Pro	Asn	Lys	Lys	Thr	Arg	Ile	Trp	Leu	Gly	Thr	Phe
65								70				75		80	

Gln	Thr	Ala	Glu	Met	Ala	Ala	Arg	Ala	His	Asp	Val	Ala	Ala	Leu	Ala
85								90				95			

Leu Arg Gly Arg Ser Ala Cys Leu Asn Phe Ala Asp Ser Ala Trp Arg
100 105 110
Leu Arg Ile Pro Glu Ser Thr Cys Ala Lys Asp Ile Gln Lys Ala Ala
115 120 125
Ala Glu Ala Ala Leu Ala Phe Gln Asp Glu Met Cys Asp Ala Thr Thr
130 135 140
Asp His Gly Phe Asp Met Glu Glu Thr Leu Val Glu Ala Ile Tyr Thr
145 150 155 160
Ala Glu Gln Ser Glu Asn Ala Phe Tyr Met His Asp Glu Ala Met Phe
165 170 175
Glu Met Pro Ser Leu Leu Ala Asn Met Ala Glu Gly Met Leu Leu Pro
180 185 190
Leu Pro Ser Val Gln Trp Asn His Asn His Glu Val Asp Gly Asp Asp
195 200 205
Asp Asp Val Ser Leu Trp Ser Tyr
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<213> *Arabidopsis thaliana*

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<222> (167)..(1171)
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ttttcaaatt tcgtcccccta tagattgtgt tgtttctggg aaggag atg gca gtt 175
Met Ala Val

tat gat cag agt gga gat aga aac aga aca caa att gat aca tcg agg 223
 Tyr Asp Gln Ser Gly Asp Arg Asn Arg Thr Gln Ile Asp Thr Ser Arg
 5 10 15

aaa agg aaa tct aga agt aga ggt gac ggt act act gtg gct gag aga 271
 Lys Arg Lys Ser Arg Ser Arg Gly Asp Gly Thr Thr Val Ala Glu Arg
 20 25 30 35

tta aag aga tgg aaa gag tat aac gag acc gta gaa gaa gtt tct acc 319
 Leu Lys Arg Trp Lys Glu Tyr Asn Glu Thr Val Glu Glu Val Ser Thr
 40 45 50

aag aag agg aaa gta cct gcg aaa ggg tcg aag aag ggt tgt atg aaa 367
 Lys Lys Arg Lys Val Pro Ala Lys Gly Ser Lys Lys Gly Cys Met Lys
 55 60 65

ggt aaa gga gga cca gag aat agc cga tgt agt ttc aga gga gtt agg 415
 Gly Lys Gly Pro Glu Asn Ser Arg Cys Ser Phe Arg Gly Val Arg
 70 75 80

caa agg att tgg ggt aaa tgg gtt gct gag atc aga gag cct aat cga 463
 Gln Arg Ile Trp Gly Lys Trp Val Ala Glu Ile Arg Glu Pro Asn Arg
 85 90 95

ggt agc agg ctt tgg ctt ggt act ttc cct act gct caa gaa gct gct 511
 Gly Ser Arg Leu Trp Leu Gly Thr Phe Pro Thr Ala Gln Glu Ala Ala
 100 105 110 115

tct gct tat gat gag gct gct aaa gct atg tat ggt cct ttg gct cgt 559
 Ser Ala Tyr Asp Glu Ala Ala Lys Ala Met Tyr Gly Pro Leu Ala Arg
 120 125 130

ctt aat ttc cct cgg tct gat gcg tct gag gtt acg agt acc tca agt 607
 Leu Asn Phe Pro Arg Ser Asp Ala Ser Glu Val Thr Ser Thr Ser Ser
 135 140 145

cag tct gag gtg tgt act gtt gag act cct ggt tgt gtt cat gtg aaa 655
 Gln Ser Glu Val Cys Thr Val Glu Thr Pro Gly Cys Val His Val Lys

150	155	160	
aca gag gat cca gat tgt gaa tct aaa ccc ttc tcc ggt gga gtg gag			703
Thr Glu Asp Pro Asp Cys Glu Ser Lys Pro Phe Ser Gly Gly Val Glu			
165	170	175	
ccg atg tat tgt ctg gag aat ggt gcg gaa gag atg aag aga ggt gtt			751
Pro Met Tyr Cys Leu Glu Asn Gly Ala Glu Glu Met Lys Arg Gly Val			
180	185	190	195
aaa gcg gat aag cat tgg ctg agc gag ttt gaa cat aac tat tgg agt			799
Lys Ala Asp Lys His Trp Leu Ser Glu Phe Glu His Asn Tyr Trp Ser			
200	205	210	
gat att ctg aaa gag aaa gag aaa cag aag gag caa ggg att gta gaa			847
Asp Ile Leu Lys Glu Lys Glu Lys Gln Lys Glu Gln Gly Ile Val Glu			
215	220	225	
acc tgt cag caa caa cag cag gat tcg cta tct gtt gca gac tat ggt			895
Thr Cys Gln Gln Gln Gln Asp Ser Leu Ser Val Ala Asp Tyr Gly			
230	235	240	
tgg ccc aat gat gtg gat cag agt cac ttg gat tct tca gac atg ttt			943
Trp Pro Asn Asp Val Asp Gln Ser His Leu Asp Ser Ser Asp Met Phe			
245	250	255	
gat gtc gat gag ctt cta cgt gac cta aat ggc gac gat gtg ttt gca			991
Asp Val Asp Glu Leu Leu Arg Asp Leu Asn Gly Asp Asp Val Phe Ala			
260	265	270	275
ggc tta aat cag gac cgg tac ccg ggg aac agt gtt gcc aac ggt tca			1039
Gly Leu Asn Gln Asp Arg Tyr Pro Gly Asn Ser Val Ala Asn Gly Ser			
280	285	290	
tac agg ccc gag agt caa caa agt ggt ttt gat ccg cta caa agc ctc			1087
Tyr Arg Pro Glu Ser Gln Gln Ser Gly Phe Asp Pro Leu Gln Ser Leu			
295	300	305	
aac tac gga ata cct ccg ttt cag ctc gag gga aag gat ggt aat gga			1135
Asn Tyr Gly Ile Pro Pro Phe Gln Leu Glu Gly Lys Asp Gly Asn Gly			

310	315	320	
ttc ttc gac gac ttg agt tac ttg gat ctg gag aac taaacaaaac			1181
Phe Phe Asp Asp Leu Ser Tyr Leu Asp Leu Glu Asn			
325	330	335	
aatatgaagc tttttggatt tgatatttgc cttaatccca caacgactgt tgattctcta	1241		
tccgagtttt agtgatatacg agaactacag aacacgtttt ttcttgttat aaaggtgaac	1301		
tgtatatac gaaacagtga tatgacaata gagaagacaa ctatagttt tagtctgct	1361		
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<210> 4

<211> 335

<212> PRT

<213> *Arabidopsis thaliana*

<400> 4

Met Ala Val Tyr Asp Gln Ser Gly Asp Arg Asn Arg Thr Gln Ile Asp

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Thr Ser Arg Lys Arg Lys Ser Arg Ser Arg Gly Asp Gly Thr Thr Val

20	25	30
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Ala Glu Arg Leu Lys Arg Trp Lys Glu Tyr Asn Glu Thr Val Glu Glu

35	40	45
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Val Ser Thr Lys Lys Arg Lys Val Pro Ala Lys Gly Ser Lys Lys Gly

50	55	60
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Cys Met Lys Gly Lys Gly Pro Glu Asn Ser Arg Cys Ser Phe Arg

65	70	75	80
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Gly Val Arg Gln Arg Ile Trp Gly Lys Trp Val Ala Glu Ile Arg Glu

85	90	95
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Pro Asn Arg Gly Ser Arg Leu Trp Leu Gly Thr Phe Pro Thr Ala Gln

100	105	110
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Glu Ala Ala Ser Ala Tyr Asp Glu Ala Ala Lys Ala Met Tyr Gly Pro
115 120 125
Leu Ala Arg Leu Asn Phe Pro Arg Ser Asp Ala Ser Glu Val Thr Ser
130 135 140
Thr Ser Ser Gln Ser Glu Val Cys Thr Val Glu Thr Pro Gly Cys Val
145 150 155 160
His Val Lys Thr Glu Asp Pro Asp Cys Glu Ser Lys Pro Phe Ser Gly
165 170 175
Gly Val Glu Pro Met Tyr Cys Leu Glu Asn Gly Ala Glu Glu Met Lys
180 185 190
Arg Gly Val Lys Ala Asp Lys His Trp Leu Ser Glu Phe Glu His Asn
195 200 205
Tyr Trp Ser Asp Ile Leu Lys Glu Lys Glu Lys Gln Lys Glu Gln Gly
210 215 220
Ile Val Glu Thr Cys Gln Gln Gln Gln Asp Ser Leu Ser Val Ala
225 230 235 240
Asp Tyr Gly Trp Pro Asn Asp Val Asp Gln Ser His Leu Asp Ser Ser
245 250 255
Asp Met Phe Asp Val Asp Glu Leu Leu Arg Asp Leu Asn Gly Asp Asp
260 265 270
Val Phe Ala Gly Leu Asn Gln Asp Arg Tyr Pro Gly Asn Ser Val Ala
275 280 285
Asn Gly Ser Tyr Arg Pro Glu Ser Gln Gln Ser Gly Phe Asp Pro Leu
290 295 300
Gln Ser Leu Asn Tyr Gly Ile Pro Pro Phe Gln Leu Glu Gly Lys Asp
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Gly Asn Gly Phe Phe Asp Asp Leu Ser Tyr Leu Asp Leu Glu Asn
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<222> (164)..(802)

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acttaaacct tatccagttt cttgaaacag agtactctga tca atg aac tca ttt 175
Met Asn Ser Phe
1
tca gct ttt tct gaa atg ttt ggc tcc gat tac gag cct caa ggc gga 223
Ser Ala Phe Ser Glu Met Phe Gly Ser Asp Tyr Glu Pro Gln Gly Gly
5 10 15 20
gat tat tgt ccg acg ttg gcc acg agt tgt ccg aag aaa ccg gcg ggc 271
Asp Tyr Cys Pro Thr Leu Ala Thr Ser Cys Pro Lys Lys Pro Ala Gly
25 30 35
cgt aag aag ttt cgt gag act cgt cac cca att tac aga gga gtt cgt 319
Arg Lys Lys Phe Arg Glu Thr Arg His Pro Ile Tyr Arg Gly Val Arg
40 45 50
caa aga aac tcc ggt aag tgg gtt tct gaa gtg aga gag cca aac aag 367
Gln Arg Asn Ser Gly Lys Trp Val Ser Glu Val Arg Glu Pro Asn Lys
55 60 65
aaa acc agg att tgg ctc ggg act ttc caa acc gct gag atg gca gct 415
Lys Thr Arg Ile Trp Leu Gly Thr Phe Gln Thr Ala Glu Met Ala Ala
70 75 80

cgt gct cac gac gtc gct gca tta gcc ctc cgt ggc cga tca gca tgt	463		
Arg Ala His Asp Val Ala Ala Leu Ala Leu Arg Gly Arg Ser Ala Cys			
85	90	95	100
ctc aac ttc gct gac tcg gct tgg cgg cta cga atc ccg gag tca aca	511		
Leu Asn Phe Ala Asp Ser Ala Trp Arg Leu Arg Ile Pro Glu Ser Thr			
105	110	115	
tgc gcc aag gat atc caa aaa gcg gct gct gaa gcg gcg ttg gct ttt	559		
Cys Ala Lys Asp Ile Gln Lys Ala Ala Ala Glu Ala Ala Leu Ala Phe			
120	125	130	
caa gat gag acg tgt gat acg acg acc acg aat cat ggc ctg gac atg	607		
Gln Asp Glu Thr Cys Asp Thr Thr Thr Asn His Gly Leu Asp Met			
135	140	145	
gag gag acg atg gtg gaa gct att tat aca ccg gaa cag agc gaa ggt	655		
Glu Glu Thr Met Val Glu Ala Ile Tyr Thr Pro Glu Gln Ser Glu Gly			
150	155	160	
gcg ttt tat atg gat gag gag aca atg ttt ggg atg ccg act ttg ttg	703		
Ala Phe Tyr Met Asp Glu Glu Thr Met Phe Gly Met Pro Thr Leu Leu			
165	170	175	180
gat aat atg gct gaa ggc atg ctt tta ccg ccg tct gtt caa tgg	751		
Asp Asn Met Ala Glu Gly Met Leu Leu Pro Pro Pro Ser Val Gln Trp			
185	190	195	
aat cat aat tat gac ggc gaa gga gat ggt gac gtg tcg ctt tgg agt	799		
Asn His Asn Tyr Asp Gly Glu Gly Asp Gly Asp Val Ser Leu Trp Ser			
200	205	210	
tac taatattcga tagtcgtttc cattttgtta ctatagtttg aaaatattct	852		
Tyr			
agttcctttt tttagaatgg ttccatttttatttttttatttttttatttttttttggat	912		
ggaaaataat tcaatacataaaa aaaaaa	937		

<211> 213

<212> PRT

<213> *Arabidopsis thaliana*

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1

5

10

15

Pro Gln Gly Gly Asp Tyr Cys Pro Thr Leu Ala Thr Ser Cys Pro Lys

20

25

30

Lys Pro Ala Gly Arg Lys Lys Phe Arg Glu Thr Arg His Pro Ile Tyr

35

40

45

Arg Gly Val Arg Gln Arg Asn Ser Gly Lys Trp Val Ser Glu Val Arg

50

55

60

Glu Pro Asn Lys Lys Thr Arg Ile Trp Leu Gly Thr Phe Gln Thr Ala

65

70

75

80

Glu Met Ala Ala Arg Ala His Asp Val Ala Ala Leu Ala Leu Arg Gly

85

90

95

Arg Ser Ala Cys Leu Asn Phe Ala Asp Ser Ala Trp Arg Leu Arg Ile

100

105

110

Pro Glu Ser Thr Cys Ala Lys Asp Ile Gln Lys Ala Ala Glu Ala

115

120

125

Ala Leu Ala Phe Gln Asp Glu Thr Cys Asp Thr Thr Thr Asn His

130

135

140

Gly Leu Asp Met Glu Glu Thr Met Val Glu Ala Ile Tyr Thr Pro Glu

145

150

155

160

Gln Ser Glu Gly Ala Phe Tyr Met Asp Glu Glu Thr Met Phe Gly Met

165

170

175

Pro Thr Leu Leu Asp Asn Met Ala Glu Gly Met Leu Leu Pro Pro Pro

180

185

190

Ser Val Gln Trp Asn His Asn Tyr Asp Gly Glu Gly Asp Gly Asp Val

195

200

205

Ser Leu Trp Ser Tyr

210

<210> 7

<211> 944

<212> DNA

<213> Arabidopsis thaliana

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<221> CDS

<222> (135)..(782)

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tactcttctg atca atg aac tca ttt tct gcc ttt tct gaa atg ttt ggc 170

Met Asn Ser Phe Ser Ala Phe Ser Glu Met Phe Gly

1

5

10

tcc gat tac gag tct ccg gtt tcc tca ggc ggt gat tac agt ccg aag 218

Ser Asp Tyr Glu Ser Pro Val Ser Ser Gly Gly Asp Tyr Ser Pro Lys

15

20

25

ctt gcc acg agc tgc ccc aag aaa cca gcg gga agg aag aag ttt cgt 266

Leu Ala Thr Ser Cys Pro Lys Lys Pro Ala Gly Arg Lys Lys Phe Arg

30

35

40

gag act cgt cac cca att tac aga gga gtt cgt caa aga aac tcc ggt 314

Glu Thr Arg His Pro Ile Tyr Arg Gly Val Arg Gln Arg Asn Ser Gly

45

50

55

60

aag tgg gtg tgt gag ttg aga gag cca aac aag aaa acg agg att tgg 362

Lys Trp Val Cys Glu Leu Arg Glu Pro Asn Lys Lys Thr Arg Ile Trp

65	70	75	
ctc ggg act ttc caa acc gct gag atg gca gct cgt gct cac gac gtc 410			
Leu Gly Thr Phe Gln Thr Ala Glu Met Ala Ala Arg Ala His Asp Val			
80	85	90	
gcc gcc ata gct ctc cgt ggc aga tct gcc tgt ctc aat ttc gct gac 458			
Ala Ala Ile Ala Leu Arg Gly Arg Ser Ala Cys Leu Asn Phe Ala Asp			
95	100	105	
tcg gct tgg cgg cta cga atc ccg gaa tca acc tgt gcc aag gaa atc 506			
Ser Ala Trp Arg Leu Arg Ile Pro Glu Ser Thr Cys Ala Lys Glu Ile			
110	115	120	
caa aag gcg gcg gct gaa gcc gcg ttg aat ttt caa gat gag atg tgt 554			
Gln Lys Ala Ala Ala Glu Ala Ala Leu Asn Phe Gln Asp Glu Met Cys			
125	130	135	140
cat atg acg acg gat gct cat ggt ctt gac atg gag gag acc ttg gtg 602			
His Met Thr Thr Asp Ala His Gly Leu Asp Met Glu Glu Thr Leu Val			
145	150	155	
gag gct att tat acg ccg gaa cag agc caa gat gcg ttt tat atg gat 650			
Glu Ala Ile Tyr Thr Pro Glu Gln Ser Gln Asp Ala Phe Tyr Met Asp			
160	165	170	
gaa gag gcg atg ttg ggg atg tct agt ttg gat aac atg gcc gaa 698			
Glu Glu Ala Met Leu Gly Met Ser Ser Leu Leu Asp Asn Met Ala Glu			
175	180	185	
ggg atg ctt tta ccg tcg ccg tcg gtt caa tgg aac tat aat ttt gat 746			
Gly Met Leu Leu Pro Ser Pro Ser Val Gln Trp Asn Tyr Asn Phe Asp			
190	195	200	
gtc gag gga gat gat gac gtg tcc tta tgg agc tat taaaattcga 792			
Val Glu Gly Asp Asp Val Ser Leu Trp Ser Tyr			
205	210	215	
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tcttcttctt ttgggttg tgagaaacga atgtaaatgg taaaagttgt tgtcaaatgc 912			

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944

<210> 8

<211> 216

<212> PRT

<213> Arabidopsis thaliana

<400> 8

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Cys Pro Lys Lys Pro Ala Gly Arg Lys Lys Phe Arg Glu Thr Arg His
35 40 45
Pro Ile Tyr Arg Gly Val Arg Gln Arg Asn Ser Gly Lys Trp Val Cys
50 55 60
Glu Leu Arg Glu Pro Asn Lys Lys Thr Arg Ile Trp Leu Gly Thr Phe
65 70 75 80
Gln Thr Ala Glu Met Ala Ala Arg Ala His Asp Val Ala Ala Ile Ala
85 90 95
Leu Arg Gly Arg Ser Ala Cys Leu Asn Phe Ala Asp Ser Ala Trp Arg
100 105 110
Leu Arg Ile Pro Glu Ser Thr Cys Ala Lys Glu Ile Gln Lys Ala Ala
115 120 125
Ala Glu Ala Ala Leu Asn Phe Gln Asp Glu Met Cys His Met Thr Thr
130 135 140
Asp Ala His Gly Leu Asp Met Glu Glu Thr Leu Val Glu Ala Ile Tyr
145 150 155 160
Thr Pro Glu Gln Ser Gln Asp Ala Phe Tyr Met Asp Glu Glu Ala Met
165 170 175

Leu Gly Met Ser Ser Leu Leu Asp Asn Met Ala Glu Gly Met Leu Leu
180 185 190
Pro Ser Pro Ser Val Gln Trp Asn Tyr Asn Phe Asp Val Glu Gly Asp
195 200 205
Asp Asp Val Ser Leu Trp Ser Tyr
210 215

<210> 9

<211> 1513

<212> DNA

<213> *Arabidopsis thaliana*

<220>

<221> CDS

<222> (183)..(1172)

<220>

<221> misc_feature

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<223> n is A, C, G or T

<400> 9

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cgactctaatt cctggagttt tcattcacga tagattctta gattgcgact ataaagaaga 180
ag atg gct gta tat gaa caa acc gga acc gag cag ccg aag aaa agg 227
Met Ala Val Tyr Glu Gln Thr Gly Thr Glu Gln Pro Lys Lys Arg

1

5

10

15

aaa tct agg gct cga gca ggt ggt tta acg gtg gct gat agg cta aag 275

Lys Ser Arg Ala Arg Ala Gly Gly Leu Thr Val Ala Asp Arg Leu Lys			
20	25	30	
aag tgg aaa gag tac aac gag att gtt gaa gct tcg gct gtt aaa gaa			323
Lys Trp Lys Glu Tyr Asn Glu Ile Val Glu Ala Ser Ala Val Lys Glu			
35	40	45	
gga gag aaa ccg aaa cgc aaa gtt cct gcg aaa ggg tcg aag aaa ggt			371
Gly Glu Lys Pro Lys Arg Lys Val Pro Ala Lys Gly Ser Lys Lys Gly			
50	55	60	
tgt atg aag ggt aaa gga gga cca gat aat tct cac tgt agt ttt aga			419
Cys Met Lys Gly Lys Gly Gly Pro Asp Asn Ser His Cys Ser Phe Arg			
65	70	75	
gga gtt aga caa agg att tgg ggt aaa tgg gtt gca gag att cga gaa			467
Gly Val Arg Gln Arg Ile Trp Gly Lys Trp Val Ala Glu Ile Arg Glu			
80	85	90	95
ccg aaa ata gga act aga ctt tgg ctt ggt act ttt cct acc gcg gaa			515
Pro Lys Ile Gly Thr Arg Leu Trp Leu Gly Thr Phe Pro Thr Ala Glu			
100	105	110	
aaa gct gct tcc gct tat gat gaa gcg gct acc gct atg tac ggt tca			563
Lys Ala Ala Ser Ala Tyr Asp Glu Ala Ala Thr Ala Met Tyr Gly Ser			
115	120	125	
ttg gct cgt ctt aac ttc cct cag tct gtt ggg tct gag ttt act agt			611
Leu Ala Arg Leu Asn Phe Pro Gln Ser Val Gly Ser Glu Phe Thr Ser			
130	135	140	
acg tct agt caa tct gag gtg tgt acg gtt gaa aat aag gcg gtt gtt			659
Thr Ser Ser Gln Ser Glu Val Cys Thr Val Glu Asn Lys Ala Val Val			
145	150	155	
tgt ggt gat gtt tgt gtg aag cat gaa gat act gat tgt gaa tct aat			707
Cys Gly Asp Val Cys Val Lys His Glu Asp Thr Asp Cys Glu Ser Asn			
160	165	170	175
cca ttt agt cag att tta gat gtt aga gaa gag tct tgt gga acc agg			755

Pro Phe Ser Gln Ile Leu Asp Val Arg Glu Glu Ser Cys Gly Thr Arg
 180 185 190
 ccg gac agt tgc acg gtt gga cat caa gat atg aat tct tcg ctg aat 803
 Pro Asp Ser Cys Thr Val Gly His Gln Asp Met Asn Ser Ser Leu Asn
 195 200 205
 tac gat ttg ctg tta gag ttt gag cag cag tat tgg ggc caa gtt ttg 851
 Tyr Asp Leu Leu Leu Glu Phe Glu Gln Gln Tyr Trp Gly Gln Val Leu
 210 215 220
 cag gag aaa gag aaa ccg aag cag gaa gaa gag gag ata cag caa cag 899
 Gln Glu Lys Glu Lys Pro Lys Gln Glu Glu Glu Glu Ile Gln Gln Gln
 225 230 235
 caa cag gaa cag caa cag caa cag ctg caa ccg gat ttg ctt act gtt 947
 Gln Gln Glu Gln Gln Gln Gln Leu Gln Pro Asp Leu Leu Thr Val
 240 245 250 255
 gca gat tac ggt tgg cct tgg tct aat gat att gta aat gat cag act 995
 Ala Asp Tyr Gly Trp Pro Trp Ser Asn Asp Ile Val Asn Asp Gln Thr
 260 265 270
 tct tgg gat cct aat gag tgc ttt gat att aat gaa ctc ctt gga gat 1043
 Ser Trp Asp Pro Asn Glu Cys Phe Asp Ile Asn Glu Leu Leu Gly Asp
 275 280 285
 ttg aat gaa cct ggt ccc cat cag agc caa gac caa aac cac gta aat 1091
 Leu Asn Glu Pro Gly Pro His Gln Ser Gln Asp Gln Asn His Val Asn
 290 295 300
 tct ggt agt tat gat ttg cat ccg ctt cat ctc gag cca cac gat ggt 1139
 Ser Gly Ser Tyr Asp Leu His Pro Leu His Leu Glu Pro His Asp Gly
 305 310 315
 cac gag ttc aat ggt ttg agt tct ctg gat att tgagagttct gaggcaatgg 1192
 His Glu Phe Asn Gly Leu Ser Ser Leu Asp Ile
 320 325 330
 tcctacaaga ctacaacata atctttggat tgatcatagg agaaacaaga aatagggttt 1252

aatgatctga ttcacaatga aaaaatattt aataactcta tagttttgt tcttccttg 1312
gatcatgaac tgtagcttct catctattga gttaatatacg cgaatagcag agtttcttc 1372
tttcttctct ttgttagaaaa aaaaaaaaaa aaaaaaaaaa aaaaaaaaaayh sakmabgcar 1432
srcsdvsnnaa nntrnatnar sarchnrr agrctrascn csrcaswash tskbabarak 1492
aantamaysa kmasrngnga c 1513

<210> 10

<211> 330

<212> PRT

<213> Arabidopsis thaliana

<400> 10

Met Ala Val Tyr Glu Gln Thr Gly Thr Glu Gln Pro Lys Lys Arg Lys

1 5 10 15

Ser Arg Ala Arg Ala Gly Gly Leu Thr Val Ala Asp Arg Leu Lys Lys

20 25 30

Trp Lys Glu Tyr Asn Glu Ile Val Glu Ala Ser Ala Val Lys Glu Gly

35 40 45

Glu Lys Pro Lys Arg Lys Val Pro Ala Lys Gly Ser Lys Lys Gly Cys

50 55 60

Met Lys Gly Lys Gly Gly Pro Asp Asn Ser His Cys Ser Phe Arg Gly

65 70 75 80

Val Arg Gln Arg Ile Trp Gly Lys Trp Val Ala Glu Ile Arg Glu Pro

85 90 95

Lys Ile Gly Thr Arg Leu Trp Leu Gly Thr Phe Pro Thr Ala Glu Lys

100 105 110

Ala Ala Ser Ala Tyr Asp Glu Ala Ala Thr Ala Met Tyr Gly Ser Leu

115 120 125

Ala Arg Leu Asn Phe Pro Gln Ser Val Gly Ser Glu Phe Thr Ser Thr

130 135 140

Ser Ser Gln Ser Glu Val Cys Thr Val Glu Asn Lys Ala Val Val Cys

145	150	155	160
Gly Asp Val Cys Val Lys His Glu Asp Thr Asp Cys Glu Ser Asn Pro			
165	170	175	
Phe Ser Gln Ile Leu Asp Val Arg Glu Glu Ser Cys Gly Thr Arg Pro			
180	185	190	
Asp Ser Cys Thr Val Gly His Gln Asp Met Asn Ser Ser Leu Asn Tyr			
195	200	205	
Asp Leu Leu Leu Glu Phe Glu Gln Gln Tyr Trp Gly Gln Val Leu Gln			
210	215	220	
Glu Lys Glu Lys Pro Lys Gln Glu Glu Glu Glu Ile Gln Gln Gln Gln			
225	230	235	240
Gln Glu Gln Gln Gln Gln Leu Gln Pro Asp Leu Leu Thr Val Ala			
245	250	255	
Asp Tyr Gly Trp Pro Trp Ser Asn Asp Ile Val Asn Asp Gln Thr Ser			
260	265	270	
Trp Asp Pro Asn Glu Cys Phe Asp Ile Asn Glu Leu Leu Gly Asp Leu			
275	280	285	
Asn Glu Pro Gly Pro His Gln Ser Gln Asp Gln Asn His Val Asn Ser			
290	295	300	
Gly Ser Tyr Asp Leu His Pro Leu His Leu Glu Pro His Asp Gly His			
305	310	315	320
Glu Phe Asn Gly Leu Ser Ser Leu Asp Ile			
325	330		

<210> 11

<211> 675

<212> DNA

<213> *Arabidopsis thaliana*

<400> 11

atgaatccat tttactctac attccagac tcgttctct caatctccga tcatacatct 60
ccggtttcag acagtagtga gtgttcacca aagttagctt caagttgtcc aaagaaacga 120
gctgggagga agaagttcg tgagacacgt catccgattt acagaggagt tcgtcagagg 180
aattctggta aatgggttg tgaagttaga gagcctaata agaaatctag gatttggta 240
ggtactttc cgacgggtga aatggctgct cgtgctcatg atttgctgc tttagctctt 300
cgtggtcgct ctgcttgcct caatttcgct gattctgctt ggccggcttcg tattcctgag 360
actacttgc ctaaggagat tcagaaagct gcgtctgaag ctgcaatggc gtttcagaat 420
gagactacga cggagggatc taaaactgcg gcggaggcag aggaggcggc aggggagggg 480
gtgagggagg gggagaggag ggcggaggag cagaatggtg gtgtgttta tatggatgat 540
gaggcgctt tgggatgcc caacttttt gagaatatgg cggagggat gctttgccg 600
ccgcccgaag ttggctggaa tcataacgac tttgacggag tgggtgacgt gtcactctgg 660
agttttgacg agtaa 675

<210> 12

<211> 224

<212> PRT

<213> *Arabidopsis thaliana*

<400> 12

Met Asn Pro Phe Tyr Ser Thr Phe Pro Asp Ser Phe Leu Ser Ile Ser
1 5 10 15

Asp His Arg Ser Pro Val Ser Asp Ser Ser Glu Cys Ser Pro Lys Leu
20 25 30

Ala Ser Ser Cys Pro Lys Lys Arg Ala Gly Arg Lys Lys Phe Arg Glu
35 40 45

Thr Arg His Pro Ile Tyr Arg Gly Val Arg Gln Arg Asn Ser Gly Lys
50 55 60

Trp Val Cys Glu Val Arg Glu Pro Asn Lys Lys Ser Arg Ile Trp Leu
65 70 75 80

Gly Thr Phe Pro Thr Val Glu Met Ala Ala Arg Ala His Asp Val Ala
85 90 95

Ala Leu Ala Leu Arg Gly Arg Ser Ala Cys Leu Asn Phe Ala Asp Ser
100 105 110

Ala Trp Arg Leu Arg Ile Pro Glu Thr Thr Cys Pro Lys Glu Ile Gln
115 120 125

Lys Ala Ala Ser Glu Ala Ala Met Ala Phe Gln Asn Glu Thr Thr Thr
130 135 140

Glu Gly Ser Lys Thr Ala Ala Glu Ala Glu Glu Ala Ala Gly Glu Gly
145 150 155 160

Val Arg Glu Gly Glu Arg Arg Ala Glu Glu Gln Asn Gly Gly Val Phe
165 170 175

Tyr Met Asp Asp Glu Ala Leu Leu Gly Met Pro Asn Phe Phe Glu Asn
180 185 190

Met Ala Glu Gly Met Leu Leu Pro Pro Pro Glu Val Gly Trp Asn His
195 200 205

Asn Asp Phe Asp Gly Val Gly Asp Val Ser Leu Trp Ser Phe Asp Glu
210 215 220

<210> 13

<211> 546

<212> DNA

<213> *Arabidopsis thaliana*

<400> 13

atggaaaacg acgatatacac cgtggcggag atgaagccaa agaagcgtgc tggacggagg 60
atttcaagg agacacgtca cccaatctac agaggcgtgc ggcgttaggga cggcgacaaa 120
tgggtatgca aagtccgtga accgattcat cagcgtcgag tctggctcgg aacttatccg 180
acggcagata tggccgcacg tgctcacgac gtggcggttc ttgctctgca cgggagatcc 240
gcgtgttga atttctccga ttctgcttgg aggttgcgg tgccggcatc cactgatccg 300
gacacgatca ggcgcacggc ggccgaagca gcggagatgt tcaggccgccc ggagtttagt 360
acaggaatta cggtttacc ctcagccagt gagtttgaca cgtcggatga aggagtcgct 420
ggaatgatga tgaggctcgc ggaggagccg ttgatgtcgc cgccaagatc gtacattgat 480
atgaatacga gtgtgtacgt ggacgaagaa atgtgttacg aagatttgc actttggagt 540
tactaa 546

<210> 14

<211> 181

<212> PRT

<213> *Arabidopsis thaliana*

<400> 14

Met Glu Asn Asp Asp Ile Thr Val Ala Glu Met Lys Pro Lys Lys Arg

1

5

10

15

Ala Gly Arg Arg Ile Phe Lys Glu Thr Arg His Pro Ile Tyr Arg Gly

20

25

30

Val Arg Arg Arg Asp Gly Asp Lys Trp Val Cys Glu Val Arg Glu Pro

35

40

45

Ile His Gln Arg Arg Val Trp Leu Gly Thr Tyr Pro Thr Ala Asp Met

50

55

60

Ala Ala Arg Ala His Asp Val Ala Val Leu Ala Leu Arg Gly Arg Ser

65

70

75

80

Ala Cys Leu Asn Phe Ser Asp Ser Ala Trp Arg Leu Pro Val Pro Ala

85

90

95

Ser Thr Asp Pro Asp Thr Ile Arg Arg Thr Ala Ala Glu Ala Ala Glu

100

105

110

Met Phe Arg Pro Pro Glu Phe Ser Thr Gly Ile Thr Val Leu Pro Ser

115

120

125

Ala Ser Glu Phe Asp Thr Ser Asp Glu Gly Val Ala Gly Met Met Met

130

135

140

Arg Leu Ala Glu Glu Pro Leu Met Ser Pro Pro Arg Ser Tyr Ile Asp

145

150

155

160

Met Asn Thr Ser Val Tyr Val Asp Glu Glu Met Cys Tyr Glu Asp Leu

165

170

175

Ser Leu Trp Ser Tyr

180

<210> 15

<211> 630

<212> DNA

<213> Arabidopsis thaliana

<400> 15

atgaataatg atgatattat tctggcggag atgaggccta agaagcgtgc ggaaaggaga 60
gtgttaagg agacacgtca cccagttac agaggcataa ggccggagggaa cggtacaaa 120
tgggtctgca aagtcagaga accgacgcac caacgcccac tttggctcgg gacttatccc 180
acagcagata tggcagcgcg tgcacacgac gtggcggtt tagctctgca tggagatcc 240
gcatgttga atttcgcccga ctccgcttgg cggcttccgg tgccggaatc caatgatccg 300
gatgtgataa gaagagttgc ggcggaagct gcggagatgt ttaggcccgtt ggatttagaa 360
agtggaaatc cggtttgcc ttgtgcggga gatgatgtgg atttgggtt tgggtcggtt 420
tccggctctg gttcgggatc ggaggagagg aattcttctt cgtatggatt tggagactac 480
gaagaagtct caacgacgat gatgagactc gcggaggggc cactaatgtc gccgcccgcga 540
tcgtatatgg aagacatgac tcctactaat gtttacacgg aagaagagat gtgttatgaa 600
gatatgtcat tgtggagtta cagatattaa 630

<210> 16

<211> 209

<212> PRT

<213> Arabidopsis thaliana

<400> 16

Met Asn Asn Asp Asp Ile Ile Leu Ala Glu Met Arg Pro Lys Lys Arg

1

5

10

15

Ala Gly Arg Arg Val Phe Lys Glu Thr Arg His Pro Val Tyr Arg Gly

20

25

30

Ile Arg Arg Arg Asn Gly Asp Lys Trp Val Cys Glu Val Arg Glu Pro

35

40

45

Thr His Gln Arg Arg Ile Trp Leu Gly Thr Tyr Pro Thr Ala Asp Met

50

55

60

Ala Ala Arg Ala His Asp Val Ala Val Leu Ala Leu Arg Gly Arg Ser

65

70

75

80

Ala Cys Leu Asn Phe Ala Asp Ser Ala Trp Arg Leu Pro Val Pro Glu

85

90

95

Ser Asn Asp Pro Asp Val Ile Arg Arg Val Ala Ala Glu Ala Ala Glu

100

105

110

Met Phe Arg Pro Val Asp Leu Glu Ser Gly Ile Thr Val Leu Pro Cys

115

120

125

Ala Gly Asp Asp Val Asp Leu Gly Phe Gly Ser Gly Ser Gly

130

135

140

Ser Gly Ser Glu Glu Arg Asn Ser Ser Ser Tyr Gly Phe Gly Asp Tyr

145

150

155

160

Glu Glu Val Ser Thr Thr Met Met Arg Leu Ala Glu Gly Pro Leu Met

165

170

175

Ser Pro Pro Arg Ser Tyr Met Glu Asp Met Thr Pro Thr Asn Val Tyr

180

185

190

Thr Glu Glu Glu Met Cys Tyr Glu Asp Met Ser Leu Trp Ser Tyr Arg

195

200

205

Tyr

<210> 17

<211> 1026

<212> DNA

<213> *Arabidopsis thaliana*

<400> 17

atgccgtcgg agattgttga caggaaaagg aagtctcgtg gaacacgaga tgtagctgag 60
attctaaggc aatggagaga gtacaatgag cagattgagg cagaatctt tatcgatgg 120
ggtgttccaa aatcaatccg aaagcctcct ccaaaagggtt cgaggaaggg ttgtatgaaa 180
ggtaaaggtg gacctgaaaa cgggatttgt gactatagag gagttagaca gaggagatgg 240
ggtaaatggg ttgctgagat ccgtgagcca gacggaggtg ctaggttgtg gctcggtact 300
ttctccagtt catatgaagc tgcattggct tatgacgagg cggccaaagc tatatatgg 360
cagtctgccca gactcaatct tcccgagatc acaaatcgct cttcttcgac tgctgccact 420
gccactgtgt caggctcggt tactgcattt tctgatgaat ctgaagttt tgacgttag 480
gatacaaatg caagttcagg ttttggtcag gtgaaaactag aggattgttag cgatgaatat 540
gttctcttag atagttctca gtgtattaaa gaggagctga aaggaaaaga ggaagtgagg 600
gaagaacata acttggctgt tgggtttgga attggacagg actcgaaaag ggagactttg 660
gatgcttgt tgatggaaa tggcaatgaa caagaaccat tggagtttgg tgtggatgaa 720
acgtttgata ttaatgagct attgggtata ttaaacgaca acaatgtgtc tggtcaagag 780
acaatgcagt atcaagtggta tagacaccca aatttcagtt accaaacgca gtttccaaat 840
tctaacttgc tcgggagcct caaccctatg gagattgctc aaccaggagt tgattatgga 900
tgccttatg tgcagccag tgatatggag aactatggta ttgattttaga ccatcgcagg 960
ttcaatgatc ttgacatatac ggacttggat tttggaggag acaaagatgt tcatggatct 1020
acataa 1026

1026

<210> 18

<211> 341

<212> PRT

<213> Arabidopsis thaliana

<400> 18

Met Pro Ser Glu Ile Val Asp Arg Lys Arg Lys Ser Arg Gly Thr Arg
1 5 10 15

Asp Val Ala Glu Ile Leu Arg Gln Trp Arg Glu Tyr Asn Glu Gln Ile
20 25 30

Glu Ala Glu Ser Cys Ile Asp Gly Gly Gly Pro Lys Ser Ile Arg Lys
35 40 45

Pro Pro Pro Lys Gly Ser Arg Lys Gly Cys Met Lys Gly Lys Gly Gly
50 55 60

Pro Glu Asn Gly Ile Cys Asp Tyr Arg Gly Val Arg Gln Arg Arg Trp
65 70 75 80
Gly Lys Trp Val Ala Glu Ile Arg Glu Pro Asp Gly Gly Ala Arg Leu
85 90 95

Trp Leu Gly Thr Phe Ser Ser Ser Tyr Glu Ala Ala Leu Ala Tyr Asp
100 105 110

Glu Ala Ala Lys Ala Ile Tyr Gly Gln Ser Ala Arg Leu Asn Leu Pro
115 120 125

Glu Ile Thr Asn Arg Ser Ser Ser Thr Ala Ala Thr Ala Thr Val Ser

130 135 140

Gly Ser Val Thr Ala Phe Ser Asp Glu Ser Glu Val Cys Ala Arg Glu
145 150 155 160

Asp Thr Asn Ala Ser Ser Gly Phe Gly Gln Val Lys Leu Glu Asp Cys
165 170 175

Ser Asp Glu Tyr Val Leu Leu Asp Ser Ser Gln Cys Ile Lys Glu Glu
180 185 190

Leu Lys Gly Lys Glu Glu Val Arg Glu Glu His Asn Leu Ala Val Gly
195 200 205

Phe Gly Ile Gly Gln Asp Ser Lys Arg Glu Thr Leu Asp Ala Trp Leu
210 215 220

Met Gly Asn Gly Asn Glu Gln Glu Pro Leu Glu Phe Gly Val Asp Glu
225 230 235 240

Thr Phe Asp Ile Asn Glu Leu Leu Gly Ile Leu Asn Asp Asn Asn Val
245 250 255

Ser Gly Gln Glu Thr Met Gln Tyr Gln Val Asp Arg His Pro Asn Phe
260 265 270

Ser Tyr Gln Thr Gln Phe Pro Asn Ser Asn Leu Leu Gly Ser Leu Asn
275 280 285

Pro Met Glu Ile Ala Gln Pro Gly Val Asp Tyr Gly Cys Pro Tyr Val
290 295 300

Gln Pro Ser Asp Met Glu Asn Tyr Gly Ile Asp Leu Asp His Arg Arg

305

310

315

320

Phe Asn Asp Leu Asp Ile Gln Asp Leu Asp Phe Gly Gly Asp Lys Asp

325

330

335

Val His Gly Ser Thr

340

<210> 19

<211> 621

<212> DNA

<213> Arabidopsis thaliana

<400> 19

atgtcatcca tagagccaaa agtaatgatg gttggtgcta ataagaaaca acgaaccgtc 60
caagctagtt cgaggaaagg ttgtatgaga ggaaaaggtg gacccgataa cgcgtcttgc 120
acttacaaag gtgttagaca acgcacttgg ggcaaattgg tcgctgagat ccgcgagcct 180
aaccgaggag ctcgtcttg gctcggtacc ttcgacacacct cccgtgaagc tgccttggct 240
tatgactccg cagctcgtaa gctctatggg cctgaggctc atctcaacacct ccctgagtcc 300
ttaagaagtt accctaaaac ggcgtcgtct ccggcgtccc agactacacc aagcagcaac 360
accggtgaa aaagcagcag cgactctgag tcgccgtgtt catccaacga gatgtcatca 420
tgtgaaagag tgacagagga gatatcatgg gagcatataa acgtggattt gccggtaatg 480
gatgattctt caatatggga agaagctaca atgtcgtag gattccatg ggttcatgaa 540
ggagataatg atatttctcg gtttgatact tgtatccg gtggctattc taattggat 600
tcctttcatt ccccaacttgc a 621

<210> 20

<211> 206

<212> PRT

<213> *Arabidopsis thaliana*

<400> 20

Met Ser Ser Ile Glu Pro Lys Val Met Met Val Gly Ala Asn Lys Lys
1 5 10 15

Gln Arg Thr Val Gln Ala Ser Ser Arg Lys Gly Cys Met Arg Gly Lys
20 25 30

Gly Gly Pro Asp Asn Ala Ser Cys Thr Tyr Lys Gly Val Arg Gln Arg
35 40 45

Thr Trp Gly Lys Trp Val Ala Glu Ile Arg Glu Pro Asn Arg Gly Ala
50 55 60

Arg Leu Trp Leu Gly Thr Phe Asp Thr Ser Arg Glu Ala Ala Leu Ala
65 70 75 80

Tyr Asp Ser Ala Ala Arg Lys Leu Tyr Gly Pro Glu Ala His Leu Asn
85 90 95

Leu Pro Glu Ser Leu Arg Ser Tyr Pro Lys Thr Ala Ser Ser Pro Ala
100 105 110

Ser Gln Thr Thr Pro Ser Ser Asn Thr Gly Gly Lys Ser Ser Ser Asp
115 120 125

Ser Glu Ser Pro Cys Ser Ser Asn Glu Met Ser Ser Cys Gly Arg Val
30/42

130

135

140

Thr Glu Glu Ile Ser Trp Glu His Ile Asn Val Asp Leu Pro Val Met

145

150

155

160

Asp Asp Ser Ser Ile Trp Glu Glu Ala Thr Met Ser Leu Gly Phe Pro

165

170

175

Trp Val His Glu Gly Asp Asn Asp Ile Ser Arg Phe Asp Thr Cys Ile

180

185

190

Ser Gly Gly Tyr Ser Asn Trp Asp Ser Phe His Ser Pro Leu

195

200

205

<210> 21

<211> 975

<212> DNA

<213> Arabidopsis thaliana

<400> 21

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ttggcgagag ctcgtagggt tcaagccaaa gttcgaaga aagttgtat gagagggaaa 180
ggtggaccag agaatcctgt ttgtcggtt agaggtgtc gacaaagggt ttggggaaa 240
tgggttgctg agatacgtga accagtgagt caccgtggtg caaactctag tcgtagtaaa 300
cggtttggc ttggcacgtt tgctactgca gctgaagctg ctttggctta cgacagagct 360
gctagtgtca tgtacggacc ctatgccagg ttaaatttcc cgaaagattt gggtggggaa 420
aggaagaagg acgaggaggc ggaaagttcg ggaggctatt gttggaaac taacaaagcc 480
ggtaatggcg tgattgaaac ggaagggtgaa aaagactatg tagtctacaa tgaagacgct 540
attgagcttgc gcatgacaa gactcagaat cctgacatgt ttgatgtcga tgagcttcta 600
cgtgaccta atggcgacga tgtgttgca ggcacgtactg ataatgaaat agtgaaccca 660

gcagttaaat caggaccggt acccgggaa cagtgttgc aacggttcat acaggcccga 720
gagttgaaat cagaggaagg ttacagctat gatcgattca aattggcaac aaagtggttt 780
tgatccgcta caaagcctca actacggaat acctccgtt cagctcataa cggattgtt 840
tataatgaac ctcaaagctc cagttatcac gagggaaagg atgtaatgg attctcgac 900
gacttgagtt acttggatct ggagaactaa cagggaggtg gattcgattc atatttgag 960
tatttcagat tctag 975

<210> 22

<211> 244

<212> PRT

<213> Arabidopsis thaliana

<400> 22

Met Glu Lys Glu Asp Asn Gly Ser Lys Gln Ser Ser Ser Ala Ser Val
1 5 10 15

Val Ser Ser Arg Arg Arg Arg Arg Val Val Glu Pro Val Glu Ala Thr
20 25 30

Leu Gln Arg Trp Glu Glu Gly Leu Ala Arg Ala Arg Arg Val Gln
35 40 45

Ala Lys Gly Ser Lys Lys Gly Cys Met Arg Gly Lys Gly Pro Glu
50 55 60

Asn Pro Val Cys Arg Phe Arg Gly Val Arg Gln Arg Val Trp Gly Lys
65 70 75 80

Trp Val Ala Glu Ile Arg Glu Pro Val Ser His Arg Gly Ala Asn Ser
85 90 95

Ser Arg Ser Lys Arg Leu Trp Leu Gly Thr Phe Ala Thr Ala Ala Glu
100 105 110

Ala Ala Leu Ala Tyr Asp Arg Ala Ala Ser Val Met Tyr Gly Pro Tyr
115 120 125

Ala Arg Leu Asn Phe Pro Glu Asp Leu Gly Gly Arg Lys Lys Asp
130 135 140

Glu Glu Ala Glu Ser Ser Gly Gly Tyr Trp Leu Glu Thr Asn Lys Ala
145 150 155 160

Gly Asn Gly Val Ile Glu Thr Glu Gly Gly Lys Asp Tyr Val Val Tyr
165 170 175

Asn Glu Asp Ala Ile Glu Leu Gly His Asp Lys Thr Gln Asn Pro Met
180 185 190

Thr Asp Asn Glu Ile Val Asn Pro Ala Val Lys Ser Glu Glu Gly Tyr
195 200 205

Ser Tyr Asp Arg Phe Lys Leu Asp Asn Gly Leu Leu Tyr Asn Glu Pro
210 215 220

Gln Ser Ser Ser Tyr His Gln Gly Gly Phe Asp Ser Tyr Phe Glu
225 230 235 240

Tyr Phe Arg Phe

<210> 23

<211> 834

<212> DNA

<213> Arabidopsis thaliana

<400> 23

atggagaaat catcctaat gaqacaatgg aagaagggtc ctgctcgaaa taaaggcggt 60
ccacaaaacg ctctttgtca gtaccgtgga gtcaggcaaa ggacttgggg caaatgggtg 120
gctgagatca gagagccaa gaagagggca agactttggc ttggctctt cgctacagct 180
gaagaagcag ctatggctta tcatgaggct gccttgaaac tctatggca cgacgcatac 240
ctcaacttac ctcatcttca gcggaataca agaccttctc tgtagtaactc tcagaggttc 300
aaatgggtac cttcaaggaa gtttatatct atgtttcctt catgtggat gctaaacgtg 360
aatgctcagc ctagtgttca cataatccag caaagactag aagaactcaa gaaaactgga 420
cttttatctc aatcctattt ttcttagttct tcctccaccc aatcaaaaac taataactagc 480
tttcttgatg agaagaccag caagggagaa acagacaata tggcgaagg tggtgatcag 540
aagaaaccag agatcgacct gaccgagttt cttagcaac taggaatctt gaaggatgaa 600
aatgaagcag aaccaagtga ggttagcagag tgtcattccc ctccaccatg gaacgagcaa 660
gaagaaactg gaagtcctt cagaactgag aatttcagct gggataccct gatcgagatg 720
ccaagaagtg aaaccacaac tatgcaattt gactccagca acttcggaag ctatgatttt 780
gaggatgatg tatttttttttccatctgg gactactacg gaagctttaga ttga 834

<210> 24

<211> 277

<212> PRT

<213> Arabidopsis thaliana

<400> 24

Met Glu Lys Ser Ser Ser Met Lys Gln Trp Lys Lys Gly Pro Ala Arg

1

5

10

15

Gly Lys Gly Gly Pro Gln Asn Ala Leu Cys Gln Tyr Arg Gly Val Arg
20 25 30

Gln Arg Thr Trp Gly Lys Trp Val Ala Glu Ile Arg Glu Pro Lys Lys
35 40 45

Arg Ala Arg Leu Trp Leu Gly Ser Phe Ala Thr Ala Glu Glu Ala Ala
50 55 60

Met Ala Tyr Asp Glu Ala Ala Leu Lys Leu Tyr Gly His Asp Ala Tyr
65 70 75 80

Leu Asn Leu Pro His Leu Gln Arg Asn Thr Arg Pro Ser Leu Ser Asn
85 90 95

Ser Gln Arg Phe Lys Trp Val Pro Ser Arg Lys Phe Ile Ser Met Phe
100 105 110

Pro Ser Cys Gly Met Leu Asn Val Asn Ala Gln Pro Ser Val His Ile
115 120 125

Ile Gln Gln Arg Leu Glu Glu Leu Lys Lys Thr Gly Leu Leu Ser Gln
130 135 140

Ser Tyr Ser Ser Ser Ser Ser Thr Glu Ser Lys Thr Asn Thr Ser
145 150 155 160

Phe Leu Asp Glu Lys Thr Ser Lys Gly Glu Thr Asp Asn Met Phe Glu
165 170 175

Gly Gly Asp Gln Lys Lys Pro Glu Ile Asp Leu Thr Glu Phe Leu Gln
180 185 190
Gln Leu Gly Ile Leu Lys Asp Glu Asn Glu Ala Glu Pro Ser Glu Val
195 200 205

Ala Glu Cys His Ser Pro Pro Pro Trp Asn Glu Gln Glu Glu Thr Gly
210 215 220

Ser Pro Phe Arg Thr Glu Asn Phe Ser Trp Asp Thr Leu Ile Glu Met
225 230 235 240

Pro Arg Ser Glu Thr Thr Met Gln Phe Asp Ser Ser Asn Phe Gly
245 250 255

Ser Tyr Asp Phe Glu Asp Asp Val Ser Phe Pro Ser Ile Trp Asp Tyr
260 265 270

Tyr Gly Ser Leu Asp
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<211> 924

<212> DNA

<213> *Arabidopsis thaliana*

<400> 25

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<211> 306

<212> PRT

<213> *Arabidopsis thaliana*

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15

Lys Gly Cys Met Lys Gly Lys Gly Pro Glu Asn Ala Thr Cys Thr

20

25

30

Phe Arg Gly Val Arg Gln Arg Thr Trp Gly Lys Trp Val Ala Glu Ile

35

40

45

Arg Glu Pro Asn Arg Gly Thr Arg Leu Trp Leu Gly Thr Phe Asn Thr

50

55

60

Ser Val Glu Ala Ala Met Ala Tyr Asp Glu Ala Ala Lys Lys Leu Tyr

65

70

75

80

Gly His Glu Ala Lys Leu Asn Leu Val His Pro Gln Gln Gln Gln

85

90

95

Val Val Val Asn Arg Asn Leu Ser Phe Ser Gly His Gly Ser Gly Ser

100

105

110

Trp Ala Tyr Asn Lys Lys Leu Asp Met Val His Gly Leu Asp Leu Gly

115

120

125

Leu Gly Gln Ala Ser Cys Ser Arg Gly Ser Cys Ser Glu Arg Ser Ser

130

135

140

Phe Leu Gln Glu Asp Asp Asp His Ser His Asn Arg Cys Ser Ser Ser

145

150

155

160

Ser Gly Ser Asn Leu Cys Trp Leu Leu Pro Lys Gln Ser Asp Ser Gln

165

170

175

Asp Gln Glu Thr Val Asn Ala Thr Thr Ser Tyr Gly Gly Glu Gly Gly

180

185

190

Gly Gly Ser Thr Leu Thr Phe Ser Thr Asn Leu Lys Pro Lys Asn Leu

195

200

205

Met Ser Gln Asn Tyr Gly Leu Tyr Asn Gly Ala Trp Ser Arg Phe Leu

210

215

220

Val Gly Gln Glu Lys Lys Thr Glu His Asp Val Ser Ser Ser Cys Gly
225 230 235 240

Ser Ser Asp Asn Lys Glu Ser Met Leu Val Pro Ser Cys Gly Gly Glu
245 250 255

Arg Met His Arg Pro Glu Leu Glu Glu Arg Thr Gly Tyr Leu Glu Met
260 265 270

Asp Asp Leu Leu Glu Ile Asp Asp Leu Gly Leu Leu Ile Gly Lys Asn
275 280 285

Gly Asp Phe Lys Asn Trp Cys Cys Glu Glu Phe Gln His Pro Trp Asn
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Trp Phe
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<211> 534

<212> DNA

<213> *Arabidopsis thaliana*

<400> 27

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atccgaaagg ctcctccaaa acgttcgagg aagggttgta tgaaaggtaa aggtggacct 180
gaaaatggga tttgtgacta tacaggagtt agacagagga catgggttaa atgggttgct 240

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aatcttccac tgctgccact gtgtcaggct cggttactgc attttctgat gaatctgaag 420
tttgcacg tgaggataca aatgcaagat ctggtttgg tcagatctct aacttctcgc 480
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<211> 177

<212> PRT

<213> *Arabidopsis thaliana*

<400> 28

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Leu Arg Lys Trp Arg Glu Tyr Asn Glu Gln Thr Glu Ala Asp Ser Cys
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Ile Asp Gly Gly Ser Lys Pro Ile Arg Lys Ala Pro Pro Lys Arg
35 40 45

Ser Arg Lys Gly Cys Met Lys Gly Lys Gly Pro Glu Asn Gly Ile
50 55 60

Cys Asp Tyr Thr Gly Val Arg Gln Arg Thr Trp Gly Lys Trp Val Ala
65 70 75 80

Glu Ile Arg Glu Pro Gly Arg Gly Ala Lys Leu Trp Leu Gly Thr Phe
85 90 95

Ser Ser Ser Tyr Glu Ala Ala Leu Ala Tyr Asp Glu Ala Ser Lys Ala
40/42

100

105

110

Ile Tyr Gly Gln Ser Ala Arg Leu Asn Leu Pro Leu Leu Pro Leu Cys

115

120

125

Gln Ala Arg Leu Leu His Phe Leu Met Asn Leu Lys Phe Val His Val

130

135

140

Arg Ile Gln Met Gln Asp Leu Val Leu Val Arg Ser Leu Thr Ser Arg

145

150

155

160

Ile Ser Lys Met Leu Ser Pro Ile Thr Ala Leu Val Lys Leu Gly Arg

165

170

175

Tyr

<210> 29

<211> 18

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Primer

<400> 29

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18

<210> 30

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<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Primer

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18